



PAG BULLETIN

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COVER:

Marketplace in Indonesia (FAO photograph by S. Bunnag.)

IN THIS ISSUE

- Food Marketing: An Introduction	Page 1
- Food Marketing Programs for Improving Human Nutrition	Page 2
- The Fair Price System in India	Page 10
- Marketing Basic Consumer Goods in Mexico: The CONASUPO System	Page 16
- Rice Production and Marketing in Indonesia Selo Soemardjan	Page 19
- Food Marketing in the Commonwealth Caribbean Curtis E. McIntosh	Page 22
- The Role of Nutritionists in Food and Nutrition Planning	Page 26
- Books	Page 28
- News	Page 31
- Meeting Reports	Page 31 and back cover
- Errata	Back cover



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FOOD MARKETING: AN INTRODUCTION

This issue of the PAG Bulletin is devoted mainly to the consideration of food marketing as an important tool for the nutritional improvement of vast masses of the population in developing countries. Our purpose is to bring to the attention of our readers the enormous nutritional significance of a multifaceted activity which, in many instances, has not caught the eye of governmental authorities, planning institutions and political, economic, social and intellectual leaders in general.

Marketing, processing and related activities exert a profound influence on food production and consumption. This influence is not always recognized, and in many cases actions taken at the extremities of the process do not bear the expected fruits because no appropriate attention was given to what happens at every step in the long journey between the farmer's gate and the consumer's table. Like a healthy circulatory system in the human body, a rational, well-organized and well-managed marketing system will permit a smooth flow of materials (food-stuffs in this case) to the different parts of the social body. Just as the human body suffers when the circulatory system fails, so do many parts of the social body when the marketing system is faulty.

Unfortunately, faulty marketing systems are all too prevalent in a majority of developing nations. The patterns, modes of operation and infrastructure facilities for the marketing of farm products--with the possible exception of a few that are exported--are generally inefficient or insufficient, or both.

The negative consequences of such inadequacies in the marketing system are felt particularly by the weakest parts of the social body. Small farmers and poor urban and rural consumers are the main victims; the former because they generally get lower prices and hence lower incomes from their marketable surpluses, and the latter because they have to pay higher prices for the goods they purchase, and thus their meager nominal incomes are further reduced in real terms. Being at the end of the process, consumers have to absorb all the inefficiencies of the marketing system in the form of higher prices.

Primary among the inefficiencies are poor storage, transportation and handling facilities, all of which contribute to huge food losses. In addition, excessive numbers of middlemen participate in the process, a condition that deserves particular consideration. It may not be the case that middlemen in general are entirely redundant; under circumstances prevailing in most developing countries, many of them perform a necessary function. The problem, however, lies in the fact that middlemen at each stage in the marketing process apply a surcharge to the price of the product; the significance of this varies with the degree of monopolistic power held by any particular middleman. For a great number of middlemen, their occupation constitutes the only way open to them for making a living, owing to the lack of

other more productive and better remunerated employment opportunities. Viewed in this context, consumers are using their food money to bear the brunt of the high costs of rural and urban unemployment and thus suffer the well-known adverse nutritional consequences.

It is clear that governments have a very important role to play in redressing the present situation. Several articles in this issue present the initiatives taken in this respect by some developing nations. Despite the different scopes and characteristics of these efforts, they share in common a desire to protect the interests of the low-income groups in their respective societies.

Food marketing is a complex subject which certainly merits much more thinking and research on the part of each national society. No easy or general solutions can be produced; each case must be studied separately, and remedial action must correspond to particular needs and circumstances. Nevertheless, we believe that the various analyses and examples given in these pages may provide valuable information and guidance as well as help create greater awareness of the problem of food marketing.

The PAG has devoted a great deal of attention to this problem, as reported in the previous issue of the PAG Bulletin, and intends to continue contributing efforts towards finding appropriate solutions, a task in which FAO and other United Nations agencies, as well as many international development agencies, are presently engaged. It is hoped that governments of developing countries will also assign to the food marketing sector the priority it deserves.

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Director, PAG Secretariat

FOOD MARKETING PROGRAMS FOR IMPROVING HUMAN NUTRITION*

It is now widely recognized that among the many causes of inadequate nutrition, the principal cause is poverty. Much attention has therefore been given, most recently by the United Nations World Food Conference, to measures which can assist the redistribution of income and food to relieve the plight of peoples in developing countries who cannot afford to feed themselves adequately.

Economic aspects of nutrition, with regard to both the production and consumption of food, were extensively analyzed in the docu-

ments of the World Food Conference. These documents made it clear that global supplies of food would adequately meet the nutritional needs of the world's present population if these supplies were equitably distributed. Yet the crucial dilemma of food marketing--how to channel available food supplies to needy consumers in a suitable form and at prices which they can afford--has not yet been reviewed in the context of world nutrition with the degree of urgency it merits.

The purpose of this paper is to stimulate discussion on this topic. It considers the scope for development of food marketing systems in developing countries and for implementing food price and subsidy policies which, if linked to other aspects of the marketing system, may contribute to improvements in human nutrition.

*Prepared by the Marketing Group, AGS, and the Education, Training and Research Group, ESN, of the Food and Agriculture Organization. Presented at the 23rd PAG Meeting, June 1975. PAG document 9/45.

THE NUTRITION PROBLEM

The nature and extent of the global nutrition problem have lately been more precisely defined. In its recent assessment, the World Food Conference concluded that populations of developing countries were subject to three common forms of nutritional deprivation. First, the inadequacy of food intake among poorer segments of the population deprives them of the calories needed to meet energy requirements. There is, therefore, a primary problem of extensive undernourishment. Second, the extra nutritional needs of specific population groups, particularly the need for additional protein in the diet of infants and pre-school children, are not adequately met. Third, there exist among many population groups dietary patterns which result in deficiencies of specific micronutrients, such as vitamin A or iron, causing the prevalence of diseases such as xerophthalmia and anemia.

The extent of these problems is now also better known. FAO's latest estimates indicate that, excluding the People's Republic of China and the other Asian centrally-planned economies, a minimum of 460 million people suffered from severe protein-energy malnutrition in 1970. Of these, about 430 million are in the developing market economies, where they represent about one-quarter of the total population, including 300 million in the Far East alone. A very large number of the severely malnourished are infants and young children. Cautious estimates made from clinical and anthropometric data suggest that, of the children under five years of age in the developing countries, 10 million suffer from severe malnutrition, 80 million from moderate malnutrition, and 120 million from less obvious and more difficult-to-define milder forms of malnutrition. Altogether, about half of all young children in the developing world may be inadequately nourished.

Even if the projected increase in the demand for food in the developing countries can be met by a combination of increased domestic

production, commercial imports and food aid, it is estimated that the numbers of severely malnourished people in these countries may reach 750 million by 1985 unless substantial food supplies become available. Faced with a problem of such dimensions it is imperative that the world community should re-examine in depth the systems by which food is supplied, priced and delivered to the low-income consumer in developing countries. Even allowing for those large segments of the rural population who depend on subsistence cultivation for their survival, this problem is primarily one of management in food marketing.

DIMENSIONS OF MARKETING

Given the nature and scale of the nutrition problem, it is clear that marketing systems for basic foodstuffs, especially cereals, must be a priority concern. For the purposes of this paper, it is nevertheless appropriate to consider food marketing, not on a commodity basis, but from the wider perspective of approaches to marketing management. Three aspects of marketing in developing countries merit particular comment.

First, all major marketing activities occurring between the agricultural producer and the final consumer, namely assembly, storage, transport, processing and distribution, which in many countries make up half the consumer price, have to be seen as part of an integrated system linking production to consumption. As the growth of urban population in developing countries increases rapidly--from approximately 20 per cent in 1960 to 40 per cent of the total population by the year 2000--there is accelerating pressure on the food marketing system to expand even faster than food production. At the same time, the system is becoming more complex since marketing channels and functions have to be extended. This growing complexity of the distribution system can easily lead to further increases in marketing costs and the price paid by consumers for food, unless the system is properly coordinated and more efficient marketing methods are introduced.

Second, the role of price in food marketing is an important one; it does not only affect the compensation for marketing services but has, at the same time, an important bearing on consumption and production. Many governments feel compelled to intervene in the process of pricing food--in particular staple food--without giving adequate attention to properly balancing the conflicting interests of the major sectors: production, marketing and consumption. There is a tendency to underestimate the consequences of price policies on the components of the food marketing and production system with obvious risks to effectiveness.

Third, an aspect of marketing that should merit consideration in this short review of policy options is social marketing. The concept of social marketing takes into account not only the return/cost ratio of the marketing operations of an individual marketing enterprise--that is, the economic viability of an operation--but also the wider social benefits and costs from the national economic and social development point of view. While planning and management techniques oriented to social cost/benefit considerations are increasingly being applied in publicly supervised or organized sectors, such as health, education, family planning and public utilities, social marketing management methods are also appropriate in the nutrition field. Several protein-rich food marketing schemes undertaken in recent years have incorporated "benefit" targets within the marketing plan and have used a conventional product with an established commercial market to subsidize an enriched food introduced at a modest price for those in most acute need. As governments become progressively attuned to the necessity for adopting social as well as economic development policies, particularly food and nutrition policies, so the criterion of social benefit may be expected more and more to influence the implementation of food marketing policies.

STREAMLINING EXISTING SYSTEMS

Introducing more efficient marketing methods

It is probable that food consumption could be considerably improved in quantity and quality

with consequent benefits to human nutrition if higher priority could be given to strengthening the infrastructure in marketing, such as transport, storage, processing and the reduction of losses. Building of more feeder roads, streamlining of transport systems and reduction of wastage due to inefficiency in harvesting, storage and inadequate packing and handling are major ways to cut costs. Losses are particularly high for perishable food. For example, in a recent marketing development project started in Iran, 30 per cent of the vegetables offered by farmers were unsalable due to inadequate harvesting, packing and grading. Speed and efficiency in routine handling, storage and transport are vital to cutting wastage, especially in tropical countries where refrigerated transport techniques are not yet an economic proposition.

Many improvements could be introduced which require little additional capital outlay, with the exception of technical advice and incentives to traders and producers. More progress in this field could be achieved through the establishment of marketing extension and advisory services, for instance through the establishment of permanent marketing development centers, such as those supported by FAO in Tanzania, Mexico, Iran, Kenya, Mali and other countries.

Improving urban marketing

During the last decade the accelerated emigration of poor people from the countryside into urban centers has led to a rapid expansion of slum areas and exacerbation of nutritional problems. The majority of urban newcomers, struggling to meet minimum needs for housing, employment and basic services, are compelled also to adjust to a very different food supply system and dietary pattern. These low-income urban populations grow in many cities at a rate of 20 per cent each year. Their greater dependence on facilities for purchase of staple foods requires considerable reorganization of both distribution and information systems within the cities, where on average two-thirds of total marketing costs of staple commodities are found to occur. Most of the present obsolete and congested wholesale markets have to be rebuilt; retail markets have to be extended,

Urgent attention is required to improve the management practices of these facilities. There is a further need for the provision of both short- and long-term credit at convenient rates, technical and business advisory services, marketing information services, and training schemes for food distribution management and staff.* Much more intensive technical advice is required to cope with the rapidly deteriorating situation, particularly in the larger cities. The poor nutritional status of the low-income consumers can be considerably improved if appropriate marketing reforms are initiated.

Improving rural marketing

Measures to correct nutritional deficiencies in the diet of rural peoples are linked to the broader task of rural economic development. The improvement of marketing facilities for basic crops and the creation of secure commercial markets for new crops are essential parts of this task. In practice, however, the role of marketing management in the rural context is frequently underrated. For instance, in several African countries difficulties that have been encountered in introducing soybean cultivation are partly attributable to the inadequacy of prior research on consumer tastes and marketing opportunities. Certain inland fish farming schemes have failed due to lack of an adequate marketing organization. In Nigeria, supplies of cowpeas declined partly due to unstable prices, compelling regular consumers of this nutritionally valuable staple to adopt nutritionally inferior substitutes.

Systematic expansion of local markets, both

*In recent years, FAO has given increasing attention to the improvement of urban food marketing systems and has organized a series of regional conferences in Latin America, Asia and Africa, where the present food marketing systems of a number of large urban areas were analyzed in depth. Special advice was offered on the planning of new wholesale markets in several cities, such as Buenos Aires, Mexico City, Teheran, Sao Paulo, Bogotá, Nairobi.

within and between rural communities, not only can help to generate economic growth but can also help to retain the revenue from marketing operations within the rural sector. From the nutritional standpoint, investment in rural marketing systems--through the provision of working capital, credit facilities, improved storage, small-scale processing equipment, material and technical services--can contribute significantly to the provision of more and more varied foods for rural consumption. It would also assist policies aimed at preventive rather than curative measures to deal with the nutrition problem and the present excessive migration of people to cities.

Vertical integration

All the suggestions made in recent years for improvements at different levels of marketing can become significantly more effective if the steadily expanding marketing channels are properly vertically integrated. The more complex marketing systems become, the more attention has to be given to the coordination of their various activities. Standardization of quality grades, of packing material and of business procedures that avoid lengthy personal inspection and negotiations are essential and offer remarkable scope for cost reduction in marketing. The vertical integration of production and distribution enterprises is a particularly desirable step. An interesting example is the recent integration of fish harvesting and marketing operations in Peru and in certain West African countries, whereby fresh and frozen fish are now available to consumers in far distant inland cities. Another prospect is the closer linkage of retail and wholesale enterprises in the form of associated or integrated chains. The linkage of a retail chain in Recife with a rice mill in the Sao Francisco Valley area has brought a 15 per cent reduction in prices to Recife's rice consumers. Similar benefits were achieved through the PAN program--a voluntary chain in Bogotá--where small-scale retailers achieved a considerable reduction in marketing costs (see below) through closer integration with a wholesaler.

SCOPE FOR DEVELOPING GOVERNMENT MARKETING PROGRAMS AND SERVICES

Facilitation and support, with consumer education

Accelerated progress in improving nutrition through marketing reforms can only be achieved if governments take a constructive and development-oriented approach to marketing and make better use of available human and capital resources. In most of the developing countries, supporting services have to be established or strengthened to introduce improvements through advice, applied research, market information, training, extension and incentive policies.

Consumer education and information services on food values, quality and prices, have to be established. The long-term process of extending and improving nutrition education of the family must be continued and strengthened. Promotion campaigns to increase consumer demand of specific food items that can contribute most to nutritional improvement is another essential activity to be extended. Campaigns for fish in Peru, for Modern Bread in India and for Superamine infant food in Algeria are recent examples in which product promotion has been regarded as an integral part of the market development plan.

Government intervention

Apart from strengthening basic support services for marketing functions to improve existing marketing systems, there is scope and need for direct government intervention in the marketing process through price stabilization schemes, establishment of government supervised marketing enterprises, operation of systems of price differentiation and the introduction of new supplementary foods.

Implementing supply and price stabilization policies. Large-scale undernourishment afflicts developing countries most severely between harvest seasons and in periods of abnormal climatic conditions, as has been shown in recent years in the tragic results

of food shortages in the Sahelian zone, Ethiopia, Bangladesh and elsewhere. Countervailing measures to stabilize both supplies and prices of basic foods, thereby reducing seasonal fluctuations in consumption, are recognized as priority policies for nutritional improvement. They are also crucial for the improvement of marketing efficiency and jointly benefit farmers, consumers and marketing enterprises.

The governments of most developing countries have already established agencies to operate national stabilization and food reserve schemes. However, the organization and management of most national stabilization agencies require strengthening, and they must hold adequate stocks of basic grains.

Also required is greater attention to the objectives and basic principles that should guide governments in the formulation of price policies affecting basic foodstuffs. Since any intervention in the price mechanism will necessitate adjustments throughout the entire production-marketing process, it is especially important that government price-fixing bodies have a clear perspective of the innumerable other factors influencing supply and demand. Often such policies have only short-term or unintended results. Recognizing, for instance, that the prevailing retail prices in free markets are too high in relation to the income level of the consumer majority, governments have been inclined to impose retail price controls. In some situations this has led to the creation of a black market at the retail level, where only higher income families could buy. In other countries, artificially low consumer prices have diverted supplies for local consumption into more profitable export markets.

Retail price controls imposed on basic foodstuffs may also have the serious consequence of depressing production output. Pursued over time, such a price policy also encourages the diversion of investment into more profitable but less vital areas of economic activity, thereby reducing the capacity of agriculture to respond quickly even when food shortages are reflected in higher prices at the farm gate.

A guiding principle in price policy formulation is to recognize where and to what degree financial incentives are necessary to keep a regular, expanding volume of supplies flowing smoothly through the marketing system. This may require, at different times, incentives to the farmer to increase yield or improve quality, incentives to the trade to modernize handling facilities or increase stocks, incentives to the consumer to buy at specified times or from specified stores. Financial incentives, flexibly applied to correct distortions or overcome obstacles in the marketing system, can contribute more significantly to the resolution of food and nutrition problems than a rigid price policy which particularly favors one sector at the expense of market stability. The selection of such incentive systems is a function of government planning authorities, and their successful operation is a challenge to marketing managers.

Developing innovative marketing. Consumer need for cheaper food and easier accessibility to sources of supply has induced many governments to establish their own distribution channels. However, the commercial policies and organizational systems generally adopted by government-operated distribution enterprises have made it difficult for them to operate even within the normal trading margins of existing channels. The earliest ventures, in Latin America for example, were sparked by a natural concern for profitability and were directed towards the establishment of supermarkets and self-service grocery stores, which were able to offer basic foods at low prices through compensatory higher margins on luxury foods and non-food items. However, this type of retail enterprise drew its clientele mostly from consumers who sought convenience, the opportunity to buy considerable quantities of food quickly and at one time for subsequent storage at home. The lower-income consumer generally has neither the cash nor the storage facilities to take advantage of such services. On the contrary, he may be obliged, to buy small quantities on credit, an accommodation generally available only from the small retailer who knows him personally and whose services depend upon exacting higher distribution margins.

To overcome this disadvantage, some governments have joined with commercial enterprises to promote the interests of low-income consumers. The PAN program in Bogotá has been initiated by CORABASTOS, a government-supported but autonomous food marketing improvement agency, to help traditional small- and medium-scale food retailers to increase their operational efficiency and to assure a continuous supply of basic food items at low prices to the consumer. The average margin of affiliated retailers was held at 12 per cent and PAN prices were generally 15 per cent lower than those of other stores. Another example of notable interest in Latin America is CONASUPO, an organization in Mexico.

In other countries, governments have sought to restrain retail prices through the operation of "fair price" shops, but the limited assortment of merchandise offered and inefficiency in management has exacted a heavy demand on government subsidies to compensate for high operational costs.

Price differentiation systems. Some governments of developing countries have in recent years adopted policies of price differentiation to achieve social marketing objectives and have applied a form of a multiple, sometimes "two-tier", pricing system for food. In essence, such a policy foreshortens the process of redistribution of income through the redistribution of expenditure. Consumers with higher incomes are obliged to pay more for the same item being sold to low-income consumers; the extra revenue from sales to the first group facilitates a subsidy to the second. For example, if an average retail price of \$100 per ton of produce X is needed to sustain an adequate level of production, then a socially-oriented marketing system would sell 60 per cent of the total supply at, say, \$120 per ton and 40 per cent to lower-income consumers at \$70 per ton. The total revenue obtained to cover production and marketing costs would be about the same, but, by welfare criteria, a more efficient distribution has been secured.

To operate successfully such a two-tier price system for basic foods, a major part of the marketed supply must be channeled through a single assembly and wholesaling agency

committed to the program. Furthermore, there must be adequate means to distinguish lower- from higher-income consumers at the retail level. The most convenient starting point is usually the agency that operates a national supply and price stabilization program for basic grains. At the retail level it must either maintain its own outlets or sell through shops contracted to apply its prices. The purchasers can be distinguished explicitly through the issuance of ration cards or food tokens, or to some extent in some situations, by the location of retail outlets or timing of sales. The food stamp scheme operated in the USA to subsidize low-income consumers is a variation of the two-tier market concept.

In India, a price differentiation system has been operated over many years for rice and wheat through "fair-price" shops. They receive wheat, for example, for R 1.25 per kg through the government procurement system. They sell no more than 2 kg at a time to each consumer at around R 1.28 to 1.30 per kg on presentation of a ration card. Taking into account the value of the sack, their margin is about 5 per cent. About half the quantity marketed goes through this channel; the remainder is sold on the free market at prices ranging from about the same to 60 per cent higher, according to quality, location and season.

Another way of applying the same principle was adopted in one African city through the sale of milk at a lower price early in the morning from bulk vehicles standing in the streets of low-income districts. The sale of milk delivered in containers to authorized retailers in other areas was permitted at higher-than-cost prices.

Systems of price differentiation inevitably are complex to operate. In situations where the organized distribution of food at varying prices is confined to normal commercial channels, acceptance of the scheme by the populations affected, including those low-income groups it may be especially designed to benefit, will usually depend on the provision of real or perceived differences in the value of the product to justify the variation

in price. For example, in marketing processed foodstuffs, differentiation may be required also in the package size or style, even in product taste and color, if the same basic product is being supplied to different population groups through different types of stores at different prices. Subsidy schemes operated wholly or partly through social service or institutional channel (e.g., school lunch programs) pose additional problems for marketing organization, since the artificially increased demand on food supplies created by such schemes may overstretch the capacity of the marketing network to handle them.

To implement price differentiation systems on a large scale, governments must face the need for massive and continuing inputs of capital, considerable organizing ability and lasting support. That they are feasible is clear, but their operation depends upon the resources and the will of the sponsoring government.

Introducing new supplementary foods. Much has been written in recent years on the problems and operational difficulties of establishing new markets for nationally-produced processed food supplements for specific vulnerable groups. However, some aspects of market planning have received little attention. Market research, product testing and formulation, sales organization and promotion planning are important facets of the marketing task to be accomplished before the physical process of marketing unfamiliar foods to the consumer can even begin. The investment risk is relatively high. Nevertheless, provided governments are prepared to subsidize such special foods, at least until a self-sustaining commercial market can be established, programs of this kind can provide a way for delivery of the requisite foods to the target group of consumers. This is particularly the case if, on the two-tier price principle, separate supplies are channeled through health and welfare channels to designated beneficiaries. For example, the social marketing approach adopted in certain infant food schemes, such as those in Algeria, Turkey and Egypt, assisted under the UNICEF/WHO/FAO program, has elevated

the nutritional goal above short-term profit objectives and encouraged the subsidized distribution to needy children of a proportion of supplies from the earliest stages of production. While this policy has postponed the date at which economic viability, in the conventional sense, can be reached, it has secured a double market base for future expansion through institutional as well as commercial distribution channels.

A variety of marketing strategies and pricing policies can be adopted in such new food ventures according to the target groups to be reached and the level of resources available to the government. It is essential, however, that programs of this kind be conceived and managed as operations in food marketing and not as a health service.

THE FUTURE DIRECTION OF FOOD MARKETING POLICIES

A massive increase in world food production is required in the next decade merely to keep pace with population growth and to sustain the present inadequate level of nutrition in developing countries. If nutrition standards are to be improved, other measures are needed in order to reduce the disparities of living standards between rich and poor and to secure a fairer distribution of essential foods. Responsibility for implementing such measures lies primarily with governments, aided by the international community. Increasing government involvement in the marketing process is, therefore, inevitable. One important step would be to streamline traditional food marketing systems through the establishment of government marketing facilitation services.

Given the political will of governments to deal with the complex problems of human nutrition, another significant step can be taken at the national level by the formulation of a comprehensive food and nutrition policy and by the incorporation of appropriate nutrition-oriented programs within social and economic development plans. Within such a framework, FAO has frequently stressed the vital role of marketing and has urged that production, marketing and con-

sumption should be treated as a single, inseparable system in planning for nutritional improvement. The focus of this integrated food system is, nevertheless, on the consumer, and some re-orientation of traditional agricultural marketing processes must be foreseen if nutritionally desirable consumption patterns are to be achieved. The concept of social marketing, as described in this paper, may, and perhaps should, become an increasingly common practice.

Whether or not nutrition planning is adopted at the national level as an integral part of development planning, it is clear that various ways are open to governments whereby their food marketing systems can be adjusted along nutritionally desirable lines. Some have been indicated in the preceding sections of this paper, involving the selective application of incentives and subsidies, initiatives to reduce marketing costs, innovative approaches to distribution, investment in target-oriented promotion campaigns and in improved marketing facilities.

Each of these subject areas requires much more profound analysis than has so far been made in the context of nutritional priorities. FAO is aware that in this paper attention has been drawn to only a few of the experiences encountered in developing countries and that detailed analysis of selected schemes initiated in different regions would be a positive step forward in basic research. Such analysis would also serve as a framework for the preparation of guidelines to governments on how food marketing systems may be adapted to nutritional goals. In view of the known and urgent nutritional needs of large segments of the population in developing countries, it is certainly timely to consider marketing as a means to nutritional improvement and to give it the attention and investment it surely deserves.

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THE FAIR PRICE SYSTEM IN INDIA*

Background

Government intervention in retail distribution of food grains in India has evolved from two practices that began during World War II. One was informal rationing, implemented by Fair Price Shops, the earliest of which were set up to benefit government employees and other workers vital to the war effort. It was intended that the shops would help to cool speculation in the open market; the shops were deemed preferable to granting workers additional cash to pay for food, which would have fueled inflation.

The other practice was statutory rationing, which operated in the cities, large towns and industrial areas and was brought into

force as the food situation worsened during the war. Thus, informal rationing was virtually eliminated, except in a few special areas. Statutory rationing is defined as the prevention of free market operations in a specified geographic region, with assurance by Government that consumers will be supplied with sufficient quantities of the rationed food grains at fixed prices. This commitment was fulfilled not only through a procurement and stocking system but also through imports to make up for shortages in internal production. As additional regions came under statutory rationing through the course of the war, the volume and hence the cost of imports increased, with the result that the Government was burdened with having to marshal scarce foreign exchange and having to meet losses on subsidized prices.

*Condensed and extracted version of a paper (PAG document 9/43) submitted to the 23rd PAG meeting, June 1975, by Drs. M.S. Swaminathan and R. Devadas, respectively Director-General and Assistant Director-General of the Indian Council of Agricultural Research. Dr. Swaminathan is also Vice Chairman of the PAG.

After the war the food situation improved and rationing was lifted gradually. Hundreds of Fair Price Shops were opened with the removal of statutory rationing starting in 1952. A more extensive system of Fair Price Shops was established following the 1956 food aid agreement between India and the United States

for supplies of wheat and rice over an assured period of three years. India had decided to release the supplies at low prices through the shops in order to bring down the market prices. Those shops set the pattern for the present Public Distribution System.

Today's Fair Price Shops, similar to their wartime predecessors, serve to counteract inflation and speculation. They supply food grains to low income groups, often through a ration card system. The shops influence the free market and thereby also benefit better-off groups by enabling them to buy their requirements at reasonable prices.

The Public Distribution System also provides for statutory rationing through Ration Shops. Such rationing is implemented when needed, as was done in response to the droughts of the mid-1960s and shortages during the early 1970s. Usually it is employed in only a few cities or large towns. One of the objectives of statutory rationing is to cordon off areas of high purchasing power, such as big cities, to keep them from drawing more than their fair share of supplies from producing regions.

In all there were more than 211,000 Fair Price and Ration Shops operating in India's Public Distribution System in 1974 - 1975, serving more than 400 million people. In 1974 more than 3.6 million tons of rice, some 5.6 million tons of wheat and almost 1.4 million tons of coarse grains were distributed through the Public Distribution System.

Objectives

Some objectives of the Fair Price System can be listed:

1. Lower food prices.
2. Avoidance of inflation stemming from wage rises induced by higher food prices.
3. Equitable distribution to ensure adequate supplies to all consumers, particularly the economically weaker sections of the population, who should be enabled to meet their minimum requirements at reasonable prices.
4. Periodic assessment of the volume of food imports and food import policies.
5. Assurance that antisocial elements do not

hold the community to ransom in shortage situations.

6. Discipline of consumers to regulate their food consumption and related habits.

Organization

The Fair Price System is administered by the individual Indian states. However, responsibility for overall food management lies with the Central Government. The country is divided into several food zones, classified as surplus or deficit zones. In most cases the zones are entire states, and interzonal movements of food are controlled by the Central Government; in some cases states may have surplus and deficit zones within their own boundaries, and there the movements are controlled by the states themselves. The Food Corporation of India (FCI) is a public entity created in 1956 by the Central Government to discharge its responsibilities in the food distribution chain. FCI operates as the Central Government's sole agency for purchase, import transport, storage, movement and sale of food grains. It has been intended that FCI have a commanding position in the market to counteract speculative activities in the private sector. FCI operates through an extensive organizational network that reaches to several thousand operating points that perform its purchasing and distribution tasks. All told, FCI issues about 12 million tons of food grains a year to the Fair Price Shops.

The rules and regulations of administration of the Public Distribution System follow a somewhat common pattern among the states. The Regional Director of FCI issues food grains from the Central Government to the state government. A chain of command within each state's system leads down to local distribution to the Fair Price Shops. The selection of wholesalers and retailers is made at the appropriate levels in the system. A group of retailers is assigned to one wholesaler, and a group of consumers is registered with one retailer.

Consumer cooperatives have been encouraged to take up wholesale and retail distribution in the Fair Price System. Cooperative

societies, with or without wholesale operations, are to be found in all cities with a population over 50,000. In 1969 there were 18,870 shops run by cooperative societies; 2647 of these were branches of 387 societies that did their own wholesaling.

In states that use a ration card system, each family, based on its number of consumption units, is allotted a fixed amount of food grains, and a monthly quota of grain is allotted to the Fair Price Shop according to the number of people or consumption units attached to the shop. States where there is no ration card system allot a maximum monthly quota uniformly to each shop. Consumers in some places can purchase from Fair Price Shops as desired, while in others they can make purchases only once a week or fortnight, depending on the commodity being purchased.

Domestic procurement

The Public Distribution System depends primarily on domestic procurement of grains, supplemented by imports. It has not been possible to find a single domestic purchase method suited to conditions in all of India's states. During the 1972 - 1973 season, procurement systems employed by the Public Distribution System in various states included 1) open market purchases; 2) pre-emptive purchases; 3) levies taken as unprocessed or processed rice from producers, millers, dealers or traders; and 4) compulsory monopoly purchases of the entire marketable surpluses of all producers of rice.

An experiment is underway in the state of Maharashtra to require producers of non-grain cash crops to pay levies on them in terms of grain. To do this they sell their crops and buy the necessary grain. By imposing a levy on all farmers, discrimination against food grain producers is removed. In addition, it is hoped that this approach will eliminate any large-scale changeover from grain crops to non-food crops.

Wholesale wheat/rice trade

To check speculative hoarding and to protect the interests of both producers and consumers,

the Government of India decided to take over the wholesale trade in wheat and rice starting with the 1973 - 1974 marketing season. The basic objectives of this measure were: a) effective public distribution of the marketed surplus in order to eliminate speculation, price distortion and resulting shortages; b) adequate prices to growers, to provide them incentives to expand their production and to market it to public agencies; c) assured availability of the grains at reasonable prices to consumers, particularly to the vulnerable sections of the population; and d) the reduced costs of wholesale trading by elimination of unnecessary middlemen as well as by other improvements in the efficiency of the system.

Buffer stocks

Because agricultural production fluctuates from year to year due to factors such as climate, the Government's food management policy requires the building of buffer stocks to meet consumer demands during lean years. Decisions must be made each year on the volume of the buffer stocks to be maintained and how they can be built up. In good years, when less pressure is put on the Public Distribution System, a certain amount of the domestic production can be transferred to buffer stocks. If a commodity is subject to chronic shortage, imports are used for building up stocks despite the strain on foreign exchange. Buffer stocks of food grains are released through the Public Distribution System only in times of need.

To impart stability to the food economy, India decided to build up a buffer stock of 5 million tons of food grains during the period of the Fourth Five Year Plan. In 1972 the Government decided to raise this to 7 million tons. Increased distribution in 1972 resulted in a depletion of these stocks, which stood at 4 million tons by May 1973.

Price policy

In 1965 the Government of India established the Agricultural Prices Commission to provide continuous advice on price policy for

agricultural commodities, particularly on processed and unprocessed rice, wheat, millet, sorghum, maize, sugarcane, oil-seeds, cotton and jute. Another purpose was to evolve a balanced and integrated price structure from the standpoint of the overall needs of the economy, with regard to the interests of both producers and consumers.

The fixing of minimum support prices and of procurement prices has been an essential feature of Government policy for the past several years. Minimum support prices are like a long-term guarantee to producers that prices will not be allowed to fall below a minimum economic level in the event a glut on the market is caused by overproduction. Procurement prices are announced by the Government for the major food grains for purchases in the quantities needed in the Public Distribution System and for building up buffer stocks. Procurement prices are generally higher than minimum support prices. To provide greater incentive to producers, the Government since 1968 began purchasing all of its food grain requirements at procurement prices. As a result, procurement prices took over the role of support prices. Thus, minimum support prices since 1973 have not been announced for many of the food grains. Instead, procurement prices are announced before the start of the sowing season to enable farmers to plan their crops in light of the anticipated returns.

Nutritional aspects

In its early stages the Food Corporation of India gave attention only to procurement and distribution of foodgrains. Now the FCI focuses also on nutritional aspects of food. Foods such as milk, eggs, fruits and fish are beyond the means of most people. Therefore, a supplement that can provide the basic nutrients at nominal cost without disturbing basic food habits, is needed. Wheat flour fortified with groundnut flour was an attempt to meet this need. Formulation of low-cost weaning foods, notably Balahar, has been another effort towards better nutrition.

During 1974 - 1975 FCI produced about

30,000 tons of Balahar to supply to CARE under the Midday Meal Program of the Government of India. During the same year FCI produced over 3,000 tons of fortified wheat flour. FCI has set up modern plants for solvent extraction of groundnut oil and production of edible groundnut meal for use in enriched foods. It also has set up 25 modern rice mills as well as a maize mill to process 7,500 tons of maize for use in the manufacture of Balahar for the Government of India.

FCI's Planning and Research Division carries out studies on various operations and processing activities of the Corporation in order to improve their performance. Currently four committees are examining in-depth the problems connected with a) production of rice bran oil; b) production of cattle feed; c) nutrition programs; and d) storage and transit losses.

Quality and storage

Effective measures for meeting and assuring quality of foodgrain stocks as well as proper storage measures for minimizing losses are prerequisites for the Public Distribution System. For these purposes FCI has constructed a system of warehouses. The storage capacity owned by FCI increased during the decade 1964 - 1965 to 1974 - 1975 from nearly 1.9 to over 5.3 million tons.

Meeting the needs of rural vulnerable groups

The determinants of food policy and the guidelines for its implementation need to be established first of all. When seeking to serve the vulnerable sections of the community, defining the concept of vulnerability and identifying the vulnerable become complex processes. Even if it is agreed to define the vulnerable as those living below the poverty line, in practice it turns out that more information is needed in order to make an operational definition. For instance, a large portion of the population in urban areas may be above the poverty line. But these people could still be vulnerable to fluctuations in prices and availability of food grains. In times of shortage, urban populations could draw to themselves disproportionate

amounts of food grains from rural areas by virtue of their greater purchasing power. Because of the unevenness of urban incomes, this may ultimately result in taxing the resources of the lower middle classes, bringing them below the poverty line.

The main thrust of the Public Distribution System must necessarily be towards serving the needs of the very poor and needy, most of whom are in the rural areas and include marginal producers and non-producers. Non-producers constitute 30 per cent of the total population, and marginal producers another 35 per cent, all of whose requirements run to 28 million tons of food grains per year. The present strategy implies tactical consideration for provisioning urban areas. The Government should, therefore, aim the Public Distribution System toward serving increasingly more of the poor, while taking care of the minimum needs of the urban community.

National food management on these terms requires a realistic assessment of requirements and availability. In order to cater more to rural areas, fewer people would be covered by the Public Distribution System in urban areas, and priorities would have to be established. In its 1975 Interim Report on Agricultural Price Policy, the National Commission of Agriculture of the Government of India (1) has suggested that the Public Distribution System normally cover the following:

1. All cities and towns with population over 100,000, excluding those in surplus zones;
2. All industrial towns covered under the All India Consumer Price Index Number scheme for industrial workers;
3. Drought-prone areas;
4. Flood-affected areas.

The Commission has estimated that the requirement of cereals for such a modified Public Distribution System may be about 12 million tons a year, based on the estimated population for 1975 and a ration of 340 g per consumer unit (discussed below) per day. With increasing population, the needed tonnage would increase; it would increase even more if rations were to be designed to meet

nutritional requirements. If a dynamic Public Distribution System is to function, food grain production must grow faster than population expansion. This means that food production must increase at an annual rate of about five per cent. Unless this basic upward trend is achieved, the Public Distribution System will not be able to cope with the demand it is expected to fulfill.

Operational aspects

Among the operational aspects of the Public Distribution System in need of attention are those that determine how much a person eats. A fixed daily ration is allowed for each consumer unit in the family; each adult is considered one unit and children are considered fractional units. The size of the ration at present is influenced by the availability of food grain for the Fair Price Shops, not by nutritional needs. The provision of 340 g of food grains per day is far from adequate nutritionally.

Problems of storage, distribution and protection against infestation are vast and lead to high administrative costs. However, FCI has been dealing with these problems most effectively.

Large areas in India are affected by recurrent droughts; these are the most vulnerable rural areas. Relief work at present is undertaken in these areas on an ad hoc basis, with grain distribution forming a part of the relief programs. Considering the worsening situation in these areas, the Public Distribution System needs to be extended to them on a regular basis, covering only the vulnerable segments of the population - the landless rural workers, artisans and the small and marginal farmers.

Floods affect considerable areas of the country every year, damaging crops and assets. The population of these areas requires assistance from the Public Distribution System. On the basis of experience in recent years, provision must be made to meet the requirements of about 30 million people who are affected by serious floods.

Agricultural laborers form a sizable proportion

of the rural community. They are generally the poorest section of the rural population, and their wages do not go up in proportion to increases in the cost of living. With the disappearance of the traditional practice of paying wages for various operations in kind, their level of living is badly affected in a situation of rising prices. In view of the effects of inflation on such laborers, the practice of paying wages in kind for various agricultural operations should, therefore, be revived. This would make more grain available to agricultural workers and also would reduce pressure on the Public Distribution System.

V. B. Singh evaluated the Fair Price Shops in Uttar Pradesh on behalf of the Planning Commission (2). He has drawn the following generalized lessons from the history of price control, Government procurement and rationing that began during the Second World War and was continued thereafter:

1. Each decontrol has been followed by prices higher than those prevailing before it;
2. During periods of shortage, price control is impossible without Government procurement and a comprehensive Public Distribution System;
3. Imports cannot substitute for a policy to promote higher production, intensive procurement and austerity;
4. Middlemen standing between producers, Government and the consumer are responsible for high prices, profiteering and hoarding;
5. It is necessary to educate the consumer in austerity and the producer in higher productivity;
6. Coexistence of open markets with rationing will not work;
7. During rationing there may be price discrimination among various income groups;
8. The urban poor have been protected but not the rural poor;
9. The State Government does not always follow the directives of the Central Government on price control, procurement and

rationing;

10. An efficient mechanism should be evolved for the procurement process to check corruption, hoarding and smuggling of food and reduce delays and inefficiency;

11. Farmers must be persuaded to participate in the procurement system through incentives rather than compulsions.

Singh's study also reveals that controlled prices have been substantially lower than market prices. Thus the Fair Price Shops have checked the general rise in prices. Another salutary effect of the Fair Price System has been change in regional eating habits; for example, wheat is now consumed widely in rice-eating regions of the South and East. Yet another has been the increasing awareness on the part of consumers of their requirements and the need to control their food consumption patterns to suit the availability of food.

The future

The necessity for continuing the Fair Price Shops is implicit. They could be merged with the Cooperative Department Stores wherever they exist. The Public Distribution System could develop a greater nutritional orientation and also serve as a medium for nutrition education. Since inadequate calorie intake is a primary cause of malnutrition in cereal-based diets, the Fair Price System, besides distributing traditional grains, could help to introduce on a wider scale the production and consumption of good sources of calories such as cassava, potato and sweet potato.

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MARKETING BASIC CONSUMER GOODS IN MEXICO: THE CONASUPO SYSTEM*

In Mexico, the *Compañía Nacional de Subsistencias Populares* (National Company for Popular Subsistencias)--known as CONASUPO--in a short time has become a major agency in the marketing of essential consumer goods, or "popular supplies." Such supplies are those necessary for the satisfaction of primary human needs; they are referred to as popular because they are widely produced and generally consumed, mainly among the lower income masses.

CONASUPO has developed an integrated marketing system with activities oriented toward low income groups in rural and urban areas through a number of different programs. It is estimated that nearly one-fourth of the population of Mexico is directly benefited in some way by CONASUPO. Operations include marketing of agricultural products as well as of non-food items such as textiles, clothing, shoes, etc.

CONASUPO is the successor to a series of institutions established beginning in the 1930s when the Mexican Government instituted regulatory activities in response to shortages and wide price fluctuations in agricultural staples, often exaggerated by speculation and monopolistic practices. Agencies were established to control the export and import of basic foodstuffs and to regulate their trade and distribution. These beginnings provided the Mexican Government with experience in the storage, distribution and sale of large volumes of supplies.

In 1961, the Government organized CONASUPOSA, a corporation charged with regulating the overall market through coordinated policies to support minimum prices through purchase of basic agricultural products at "warranty prices" and to place them priced within reach of the lower income

population. CONASUPOSA was reorganized in 1965 as CONASUPO, a decentralized public service entity that would become directly involved with the entire range of marketing functions in addition to the regulatory activities of its precursors. By the early 1970s it was felt that CONASUPO had succeeded in increasing production and improving marketing channels but that the benefits could be distributed still more equitably. Thus CONASUPO has been sharpening its aim more directly toward the lower income segment of society, especially in rural areas.

Structure and activities

Basically, the CONASUPO system consists of a central body which integrates a group of subsidiary companies. The central body, with headquarters in Mexico City, is administered by a board of directors and a Director General appointed by the President of Mexico. The board of directors includes Mexico's Minister of Finance as chairman as well as the Ministers of Agriculture and Livestock and of Industry and Commerce. The Director General has executive authority and is the overall manager of the system.

The subsidiary companies are the operating entities of the vertically integrated CONASUPO system. The subsidiaries operate semi-autonomously and have organizations suited to the needs of their particular specialized activities.

CONASUPO activities, particularly in the field of popular supplies, respond to a clear political commitment on the part of the Government of Mexico to intervene directly in the promotion of economic and social development with the aim of benefiting the economically weakest population groups. The regulatory activities have avoided undue speculation and excessive profits for middlemen, having greatest impact in times of abundance when crops are purchased from farmers at prices that otherwise would be depressed, and in times of scarcity when

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supplies are maintained at fair prices for consumers. Thus, both consumers and producers have benefited.

Over the past 20 years CONASUPO and its predecessors have operated a system of guaranteed minimum prices for agricultural products which began with maize and now also includes beans, wheat, rice, soybeans, sorghum, sesame, saffron and a few non-food products. In addition, CONASUPO operates the Government's import and export program for grains and other foodstuffs, depending on sufficiencies or deficiencies of these products in relation to consumption needs.

The domestic purchase programs are carried out by a subsidiary company, BORUCONSA, which operates some 2700 primary warehouses in rural areas, where the grain and other products purchased are handled and stored. Important to these activities has been the implementation of a system of quality standards. BORUCONSA also furnishes agricultural inputs and facilitates some primary processing, such as shelling of maize.

Nearly 650 urban warehouses in the National Deposit Warehouse system (ANDSA) are linked to the CONASUPO system. The combined storage capacity of the rural BORUCONSA warehouses and the urban ANDSA warehouses is about 4.6 million tons, enough to permit CONASUPO to maintain effective regulatory reserves, which are mobilized according to the needs of the market and overall supply situation.

Another sector of Mexican agriculture has become the focus of a new CONASUPO marketing activity. A newly-established subsidiary, ACONSA, is to handle procurement, processing and distribution of perishable agricultural goods, initially in connection with a new wholesale produce market to serve Mexico City.

The CONASUPO activity that most directly affects consumers is the distribution of popular supplies at the retail level. This is the responsibility of DICONSA, a subsidiary that operates as a decentralized group of

enterprises. Through DICONSA, CONASUPO makes available to the urban and rural population of Mexico over 3,000 different products through nearly 3,000 retail outlets. The retail centers vary in size and nature. For instance, in urban areas there are nearly 200 "Conasuper" supermarkets as well as over 1200 small "popular stores." There are also over 400 rural stores, some 700 stores in government offices to serve employees in the public sector and about 120 mobile units (stores-on-wheels) to serve workers engaged in public works in various parts of the country. In addition, there is a variety of other kinds of retail units set up to serve specific clienteles in various geographic areas. There are also rural and urban concessionary stores, supplied by DICONSA but owned by individuals such as retailers in public markets or by groups such as small farmers or workers formed in cooperatives or other associations. A system of some 50 warehouses supplies the various retail outlets.

An important feature of the DICONSA operations is their decentralized administration. DICONSA is divided into six regional subdivisions, each with its own capital and responsible for stocking and supervising the CONASUPO stores in its region. This allows for a degree of flexibility and responsiveness to meet local needs. The central office in Mexico City sets general policies such as pricing, but the operating decisions are made in the regions.

Situated between agricultural producers and retail consumers is the food processing industry. Here CONASUPO operates both as supplier and as participant. It supplies commercial and food processors with the required basic raw materials (wheat, maize, sorghum, barley, oilseeds, oils and fats) for the manufacture of maize and wheat flour, starch, glucose, balanced foods, cooking oil and soap. CONASUPO participates directly in food processing through three subsidiaries: TRICONSA mills wheat into flour, produces baked goods and distributes its products through DICONSA; MINSA processes maize into flour that is used primarily for making tortillas, a basic Mexican food; and ICONSA,

recently established to process cooking oil for distribution in the CONASUPO system.

In its role as supplier to food processors, CONASUPO regularizes the supply situation, allowing companies to plan their production in a stable and continuous manner and to sell their products at price limits fixed by the government. In its role as participant in the food processing industry, CONASUPO benefits consumers not only through the economies of vertical integration but also as the public's "own" competitor in the normally private industrial marketplace. Both roles contribute toward reinforcing CONASUPO's regulatory activities.

CONASUPO has not limited its industrial activities solely to food; a subsidiary, ARCONSA, produces low-priced clothing and shoes. Nor has CONASUPO missed other opportunities to improve its services and contribute at the same time to the development process. A subsidiary, CECONCA, is responsible for training, particularly rural workers, in specific skills such as improved farming techniques, operation of BORUCONSA warehouses and the management of DICONSA stores. Another important development need will be addressed by MACONSA, a subsidiary recently organized for buying construction materials from small producers in rural areas for use in public construction projects, thus encouraging new rural industries.

It is estimated that savings for consumers benefited by CONASUPO's programs range from 10 to 18 per cent of expenditures on goods purchased; nearly three-fourths of

DICONSA's total sales correspond to food products, the balance to other essential goods. From this, it becomes clear that the huge operational machinery of CONASUPO, with its regulatory and direct supply functions, has permitted lower income groups to buy more and better food--with the implied positive nutritional benefits--than would have been the case had only the normal commercial channels been available.

CONASUPO is also involved in activities that aim at direct rather than implied nutritional benefits. The LICONSA subsidiary imports low-fat dried milk, reconstitutes it and fortifies it for distribution primarily in the Mexico City area to low income residents, at less than one-third the commercial price. Further, CONASUPO plays an important role in the activities of the National Food Program (PRONAL), which is a body at the highest governmental level, created to investigate, plan and recommend policies aiming at the supply of highly nutritious foodstuffs to low income segments of the population, at prices within their means. As part of CONASUPO's contribution to such efforts, LICONSA has launched a program of sales of baby formula (CONLAC) and flavored milk (CHOCOLAC) to low income groups. It has also established an evaporated milk plant. In addition, CONASUPO is planning to set up a plant for the production of soybean products to be used in the enrichment of bread, tortillas and various kinds of pasta. In these endeavors CONASUPO has the technical back-up of the National Nutrition Institute, which is also the nutritional unit of the National Food Program.

RICE PRODUCTION AND MARKETING IN INDONESIA

Selo Soemardjan*

The development plans of Indonesia have assigned top priority to agriculture, particularly to the production of rice, the nation's staple food. Results of a 1971 family budget survey underline the priorities: 63.4 per cent of the family budget goes for food; 49.3 per cent of the food component, that is 31.3 per cent of the total budget, is spent on rice alone.

The BIMAS (for Bimbingan Massal or "Mass Guidance") program and related efforts on the island of Java since 1969 have been aimed at increasing rice production. BIMAS is an outgrowth of experiments begun in the early 1960s at the Bogor Institute of Agriculture, directed at increasing land productivity without resorting to mechanization. The program includes the following five action elements: use of high yielding seeds, irrigation, row planting instead of haphazard planting of rice, use of fertilizers, and use of pesticides. The numeral 5 has a special meaning for Indonesians. When the Republic of Indonesia was founded in 1945, a basic philosophy with five principles, the Pancasila, was adopted. Over the years, the Pancasila has often been a rallying point for bringing together opposing views on vital issues.

Of the 13,000 islands of the Indonesian archipelago, Java was chosen for the program. Java has an extremely high agricultural population density, a highly developed--but non-mechanized--traditional rice planting technology, already existing irrigation systems, and an urgent need to sizably increase its rice supply. The Indonesian Government determined the BIMAS program to be most feasible and promising for Java because expansion of arable land is not possible, and mechanization of farming methods is too

costly and denies too many people a chance to earn a living by farming. Although the Government since prewar times has actively encouraged migration away from Java, the net flow has remained inwards. Family planning came to Indonesia only in 1969, and it is still too soon for significant effects to be felt.

The 1969 launching of the large-scale BIMAS program encompassed an initial area of some 100,000 hectares and involved about 200,000 farm families in East, Central and West Java. Extension workers were sent to educate the farm population and village administrators on the program and to secure their support and active participation. Irrigation works, neglected for over 20 years, were rehabilitated, and new dams and canals were built where necessary. Farmers were already aware of row planting of rice from the Japanese occupation (1942-1945), but they did not practice it afterwards; it was readily adopted in the BIMAS area after some educational persuasion. High yielding "miracle rice", strains IR 5 and IR 8, originated at the International Rice Research Institute (Los Baños, Philippines), were multiplied in Java and distributed to farmers at subsidized prices. (Today, more advanced varieties with improved taste and insect resistance are planted.)

Because subsistence farmers cannot afford to pay cash for seeds, fertilizers and pesticides, a credit system was developed for supplying these inputs. Private companies, mostly foreign, were contracted by the Government to supply fertilizers and pesticides to the farmers in the amounts necessary at the specific times needed in the designated BIMAS areas. The contract also covered aerial spraying of pesticides and the supply of hand sprayers to farmers. Pertani, a government-controlled agricultural corporation, acted as intermediary in this distribution system. The increase in rice production was expected to be ample enough to enable the farmers to repay the

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Government for the materials and services they had received on credit.

The rice production increase for 1969 was substantial. An estimated 60 per cent of the total rice production was retained by the farmers for family consumption; the remaining 40 per cent entered the food market. However, the sudden increase in the rice supply caused the price paid to BIMAS farmers to drop sharply. Consequently, despite the larger volume of rice available to farm families, their cash income did not increase appreciably.

In part because of the drop in rice prices and in part because farmers felt the first BIMAS program to be the Government's rather than a people's program, the farmers were reluctant to comply with the Government's loan repayment regulations. The Government paid the suppliers but was left with a sizable bad debt which was eventually waived entirely.

Thereafter, a different distribution and credit system was instituted. Fertilizers and pesticides are now channeled from private suppliers to farmers through a system of rural distribution centers controlled by Pertani. Those who wish to participate in BIMAS must obtain credit from the local bank to purchase seeds, fertilizers and pesticides from the distribution centers. A farmer can also obtain an additional sum from the bank as subsistence credit to bridge the lean months before harvest. In borrowing from the bank, the farmer in the new system admits that his participation in the BIMAS program is his own decision and that he himself undertakes responsibility to work toward a successful crop and to repay the loan.

Under the new regulations, BIMAS has enlarged over the years. For the crop period 1974-1975 it covered about 2.4 million hectares of irrigated rice fields and involved more than 2.5 million farmers. BIMAS has become institutionalized, and the number of bad debts has remained satisfactorily low. In many areas BIMAS has been transformed to INMAS (for Intensifikasi Massal or "Mass

Intensification"). INMAS differs from BIMAS in only one respect: the farmer pays the entire cost of his inputs, without resorting to the local bank for credit. INMAS lends prestige to the farmer, connoting his ability to pay his own way into the world of modern farming. Since 1972, the rice producing area under INMAS has exceeded that of BIMAS. Aside from material gains to farmers in both programs, a psychological dimension of satisfaction has come with their participation in modern agriculture.

Today, in connection with BIMAS and INMAS there is a Government policy to keep prices of fertilizers, pesticides and ultimately of rice within affordable limits. BULOG, the Government's rice distribution agency, and DOLOG, its branches in the provinces, existed before BIMAS. In fulfilling its primary responsibility of organizing a national buffer stock of rice, BULOG purchases from both foreign and domestic sources. In the years 1970 to 1974 an average of 800,000 tons of rice were imported annually, heavily subsidized by the Government to keep down the price to consumers. Rice prices on the international market in recent years have risen so high as to make the retail price at least Rp. 200 per kg (U.S. \$1.00 = Rp. 415). The subsidy permits top quality rice to be purchased at retail for no more than Rp. 120 per kg.

In the purchase of domestic rice, BULOG uses the services of existing farm cooperatives or else an agency that helps farmers to organize into cooperatives. These village level organizations purchase the rice from farmers at harvest time at fixed minimum prices and deliver it to BULOG or DOLOG also at fixed prices. BULOG sells its rice on the open market and fixes ceiling prices, when necessary, in order to achieve price stability. Although price increases cannot be stopped, BULOG can prevent destructive price shocks from upsetting the market.

International monetary instability and inflationary pressures, however, have pushed rice prices steadily upwards. The minimum price to farmers per kg of unprocessed rice was set at Rp. 13.20 in 1970, rose to 17.50

in 1972, to Rp. 21.20 in 1973, and was Rp. 30 in 1974. Production costs rose as well; for example, the prices farmers had to pay for fertilizers increased by 50 per cent at the end of 1974.

Price rises have had a particular impact on Government subsidies for imported foods, principally rice, sugar and wheat flour. In 1969 - 1970, the subsidies amounted to Rp. 3.9 thousand million; they are now Rp. 218.4 thousand million or seven per cent of the national budget. The Government clearly recognizes that it cannot go on forever paying out high subsidies and has adopted the policy of applying whatever means available to increase food production and make the country self-sufficient in food within a reasonable period of time. Towards these ends, feasibility studies are underway for establishing large-scale rice production operations outside of Java, using either private or mixed public and private capital.

The combined effects of food grants and loans from external sources, Government-subsidized imports, and increases in domestic production have resulted in a continually increasing rice supply. In fact, rice consumption rose from about 95 kg per person in 1967 to approximately 126 kg in 1973. The real consumption figure may be somewhat higher, because in some areas of Indonesia rice is not the staple food. Instead, the staple may be maize, cassava or sago. Although there are no exact statistics, the number of people in these areas is an estimated 10 to 15 per cent of Indonesia's population of 126 million. It is worth noting that rice consumption has been steadily increasing among this group and that one important reason is that a staple food other than rice connotes relative poverty and backwardness. In part, it is a matter of pride for such people to add increasing amounts of rice to their diets.

Encouraging results of the BIMAS rice program in Java has led to the introduction of similar schemes on the islands of Sumatra, Kalimantan, Sulawesi and Nusa Tenggara.

The system is also being applied on a modest scale with reasonably good results for crops other than rice, including maize, sorghum, soybeans, groundnuts, mung beans and sweet potatoes. Favorable experience with a BIMAS program in poultry farming near Jakarta seems to warrant wider application.

Another aspect of the BIMAS and INMAS rice programs has been the introduction of new processing facilities. Traditionally, the hulls are removed from paddy rice (unprocessed rice, with the hulls intact) by hand, using wooden implements. This method is appropriate for small farmers in that they and their families can do the work by themselves in their own homes, although it results in a high proportion of waste. Simultaneous with the introduction of the BIMAS program, the Government encouraged the use of rice hulling machines, made in Indonesia, which technologically inexperienced villagers find relatively simple to use. The machines are easy to handle and make the work more efficient with less waste. Owned and operated by individual farmers or farmers' cooperatives, the hullers serve people in the villages and their surroundings. A fee in kind is charged, about 3 to 5 per cent of the rice processed.

In 1968 some 7,700 rice hullers were in operation with a total capacity of 2.2 million tons, or about 20 per cent of the country's total rice production. In 1973, the number of hullers increased to nearly 24,000, capable of processing over 12 million tons, or 86 per cent of the total rice harvest.

One element of the BIMAS and INMAS programs that requires more attention than has been given until now is the proper storage of rice and other agricultural products. The traditional storage technology for rice and other non-perishables results in considerable losses from rats and the consequences of high humidity. A low-cost intermediate storage technology for use in villages should be devised and implemented to reduce unnecessary wastage of food.

FOOD MARKETING IN THE COMMONWEALTH CARIBBEAN

Curtis E. McIntosh*

Introduction

Food marketing is concerned with the performance of all the business activities necessary to get foodstuffs from where they are produced to consumers, in the quantity, quality or form, time and place desired by them. It is also concerned with the development of a system of transfer pricing and communication among participants within the marketing system (1).

The activities performed during the marketing process include: a) the exchange functions of buying, selling and price determination; b) functions relating to supply comprising assembly and transportation, storage, food processing and preparation; and c) synergistic functions consisting of market information and news, financing and risk acceptance, grading and standardization, product development, demand creation and supervision. These activities are performed with varying degrees of sophistication, depending on the stage of evolution of the marketing system (2).

While the concept of food marketing gives explicit recognition to the physical and technical aspects associated with enhancing the place, quality and form, and time utility of foodstuffs, emphasis must be placed on the pricing and communication activities which determine the way resources are organized in providing the products and associated services (3). However, the physical and technical aspects of food marketing are important in their own right since they constitute an area where great leaps toward industrialization could be made.

The procurement and distribution policies and practices of food firms have a pronounced influence on food supplies and the ability of consumers to obtain them. Although pricing is only one of the many instruments of market policy, price is the variable that commands the most attention of food economists. In an economy in which the interaction of incomes and prices determines the ability of the population to obtain a satisfactory level of nutrition, the volatile price variable is of particular significance. This paper attempts a short review of the development of the food marketing system in the Commonwealth Caribbean and discusses the pricing practices of food firms in the region.

Development of the food marketing system

The early Caribbean inhabitants--the Carib Indians--we are told, were basically subsistence producers with an exchange system based on barter. Colonization and trade in the Caribbean by Europeans rapidly developed from the barter system to a market economy transplanted from Europe, with money as the medium of exchange.

A plantation economy developed during the colonial era and persists even today; it relegated the Caribbean countries to serve as a) sources of agricultural raw materials--sugar, cocoa, bananas, spices--for processing, consumption or export by the European powers; and b) markets for agricultural inputs and food supplies originating in Europe. The food import dependency of Caribbean economies had its genesis during this era.

Just as the plantations were owned and operated by Europeans, the food marketing system was dominated by European-based firms. Produce obtained in European markets was transported in European ships, stored in Caribbean-located European-owned storehouses and distributed to consumers through a large number of small shops which developed through local entrepreneurship. The pre-retail side was controlled by a few European firms while

*Food Economist (Research), Caribbean Food and Nutrition Institute (CFNI), Trinidad Centre. Edited version of discussion paper for Workshop on Food Economics and Food and Nutrition Policy organized by CFNI, July 1975. Published with the kind permission of CFNI.

retailing was fragmented and essentially local.

Another fragmented group of sellers developed to market the locally produced food crops and livestock products. Food crop production for direct consumption remained undeveloped given the limitations of quantity and quality of land, lack of sufficient capital, management and technology, and an undeveloped marketing system which faced strong competition from the import food marketing segment. This system linking local production and consumption might be referred to as indigenous, as opposed to the externally controlled import system linking European food producers and processors with local consumers.

The indigenous system, exemplified by the Jamaican "higgler" system of itinerant merchants who bought farmers' produce to sell in town, exhibited to a high degree the features of the "perfectly" competitive market structure as distinct from the oligopoly or monopoly elements present in the colonial system. Whereas the incomes and profits generated by the indigenous marketing system were destined for local recycling, there was a high degree of repatriation of the incomes and profits derived from the import system. These features are present even today, although perhaps to a lesser degree. The legacy of this pattern of food marketing development is that Caribbean countries remain in a state of underdevelopment and include a high dependence on foreign sources for their food staples.

A serious consequence of food importation within the described market structure is that of food price inflation. A part of this inflation originates in the producing country or in the services associated with getting the supplies from the producing country to the Caribbean. Another part is due to the pricing practices of food distribution firms, as will be shown later.

Other more recently developed institutions playing a role in the supply and distribution of foods are the food processing firms, supermarkets, hotels and restaurants. The

food processing firms in the region are in the main branch plants of multinational corporations that mill, mix and package imported raw and semi-processed materials. The major local input is labor--often excluding top management positions. A high concentration or near-monopoly structure is characteristic of these food processing firms. A serious consequence of this type of development, perhaps with the exception of Guyana, is the absence of linkages between these food processing firms and the local food production units.

Supermarkets in the region have taken over some of the functions of the small shops dealing in imported products and some of the functions of the indigenous marketing system. Like their counterparts in the more advanced countries, they now include non-food items. They also distribute the products of the food processing firms. With their emphasis on imported and long shelf-life items, linkage with local production is minimal.

The hotels and restaurants serve prepared foods for tourists and people eating away from home. They use essentially what ingredients they can obtain from other marketing institutions or what they are permitted to import.

Pricing policies and practices

Most economists, I believe, have conceded that the simple laws of supply and demand rarely operate in determining prices as the following adaptation from Kohls suggests, "There is no special section of heaven where angels of supply and angels of demand get together to establish prices which are then sent down to the markets of Kingston, Port-of-Spain or Roseau. Prices of commodities are made by men using whatever information they have and trying to get the best possible deal at the moment in time, and at the place they find themselves" (4).

With the possible exception of the indigenous food marketing system previously described, where demand and supply determine price,

the Caribbean food marketing system is replete with examples of supply, demand and price manipulation.

Cognizant of the imperfections of the food marketing system and conscious of the need to provide consumers with cheap staples, governments in the region have enacted price control legislation empowering ministers responsible for food marketing to set maximum prices or percentage markups for selected foodstuffs. Further, through agricultural marketing agencies, some governments have attempted to regulate the marketing of locally produced and imported foodstuffs. The rationale for governmental intervention and control of the price system could be gleaned from Jones's assertion, "The invisible hand cannot be trusted to guide economies in socially acceptable directions nor can the State rely on the marketing system to perform the tasks assigned to it without appropriate facilitating services best provided by the Government" (5).

Despite the efforts of Caribbean governments, food pricing practices of firms give rise to serious problems. Food firms apply pressures on governments to increase prices through cessation of importation and through hoarding food supplies while requests are being considered. Efforts must be directed towards formulating a rational food distribution policy.

Generally, the prices of imported staples in the Caribbean are administered by boards of directors of the firms handling the products, sometimes with modifications by governments' price commissions or other price regulating bodies. A policy of full-cost pricing--fully allocated cost plus a fixed dollar or percentage profit margin--is pursued. A variant of this is target pricing, in which forecast sales are brought into the calculation of a price that will ensure a specific rate of return on investment.

Assuming that the costs applied are legitimate, the constant dollar markup theoretically has few inflationary consequences. The firm's financial position is improved

essentially by increased sales volume. However, in practice, when price control agencies allow a constant dollar markup, sales promotion activities and distribution services are increased, leading to higher selling costs to justify price increases for controlled items.

When a fixed percentage markup is allowed on imported staples, the imported inflation is escalated in the following manner. Assume a margin of five per cent to cover duties, taxes and customs clearance costs, an importer/wholesaler margin of 10 per cent and a retailer margin of 10 per cent. Then, an imported item whose c.i.f. (cost, insurance and freight) price is \$1.00 would cost the consumer \$1.27. If the c.i.f. price were increased to \$1.10, the cost to the consumer would be \$1.40. Thus, in addition to the \$0.10 increase on the item, the consumer would have to pay an additional \$0.03 to the handlers of the foodstuff. In the rather unlikely case where the c.i.f. price decreased, firms would be rather reluctant to reduce prices unless they were forced to do so.

The fixed percentage markup is a disincentive to seeking cheaper sources of supplies. It also creates an avenue for collusion between foreign suppliers and local agents in increasing prices.

Firms engaging in target pricing could have inflationary consequences, depending on the level and rate of increase of the return or investment. However, the rate of return might be set relatively low so as not to invite competition, in which case the inflationary effect would be minimal.

The marketing of locally produced food, as already stated, is performed mainly by an indigenous marketing system and more recently by state-controlled marketing agencies. The traditional market vendors collect and market relatively small quantities of produce from geographically dispersed farms. They handle a wide range of highly perishable products, and due to their meager capital and technical resources, their performance of the activities of transportation, storage

management and processing is far from satisfactory. The large number of participants in the trade, the volume and similarity of their produce, freedom of entry and exit, and general knowledge of market conditions put sellers in a poor bargaining position with respect to fixing prices. Prevailing prices are accepted or the consequences of spoilage fall heavily on these sellers.

Many in the field of food marketing have suggested that this indigenous system is characterized by exorbitant prices and profits. (I am yet to meet those who have made their millions from this trade.) In fact, this is one of the reasons advanced for establishing the state-controlled marketing agencies. Most of these agencies, however, although better provided with capital, manpower, buildings and equipment, have been accumulating sizable annual deficits for several years. Many attempt to operate at a fixed percentage markup but this is disposed of below purchase price. Some of the agencies justify their existence by suggesting that their role is developmental and not one that is profit-oriented. This argument cannot be accepted because such agencies could hardly foster development if their own existence is threatened by continued losses. These agencies should re-examine their pricing policies and practices.

Toward a solution

From the foregoing discussion, pricing policies and practices of food marketing firms give cause for national concern. Research into the mode of price formation or administration is needed so that appropriate policies can be formulated. The Caribbean Food and Nutrition Institute is engaged in such an exercise in Trinidad and Tobago. This kind of research must be extended, especially to the less developed Caribbean countries where incomes are lower and prices are higher.

While awaiting basic data from research, the following price policy guideline is suggested. Firms dealing in food importa-

tion should be made to adopt a constant dollar markup in their pricing practices. The amount should be changed from time to time to reflect increased local costs. The inflationary consequences of this method should be less severe than the fixed percentage markup. Consideration might also be given to a single food import agency to seek out the cheapest sources of supplies and stall the hoarding activities of food firms. The fixed percentage markup could be permitted for indigenous marketing firms which link producers and consumers. This method is suggested for such firms so that the effects of price changes could be transmitted with the same relative magnitude from the retail level to the farm level. In this way farmers should become more responsive to market changes.

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THE ROLE OF NUTRITIONISTS IN FOOD AND NUTRITION PLANNING*

It is now generally agreed that nutrition planning consists essentially of focusing sectoral plans on nutritional objectives. Primary planning efforts are directed toward: a) assuring that individuals have the means to obtain an adequate diet; b) assuring that the food supply is nutritionally sound, i. e., that it is quantitatively and qualitatively sufficient, and safe; c) informing consumers so that they can select an adequate diet; d) improving the biological utilization of food; e) monitoring the nutritional status of the population; and f) by research and training, fostering the acquisition of new knowledge necessary to better achieve these ends.

Having agreed that nutritional goals are achieved by means of a range of policies formulated by various specific sectors, the question has been raised, "Why involve nutritionists in the planning process?" To answer, it might be useful to clarify first what constitutes nutritional competency in this regard.

The senior professional human nutritionist brings to the planning exercise a body of scientific knowledge outside the scope of other experts, experience with techniques required for identifying populations and individuals at risk of nutritional deficiency, ability to analyze the relevance and likely effectiveness of some of the total range of policy measures for reducing malnutrition, and familiarity with the infrastructures through which nutritional services are delivered. Ordinarily, a senior nutritionist involved in planning would be supported by the services of other nutritionists having narrower specialty competencies. All qualified human nutritionists, even those of relatively junior rank, have knowledge of the quantitative requirements for 30 essential nutrients and energy, of the semiquantitative requirements for approximately 15 other

nutrients, and of the hazards of deficiencies, excesses and imbalances among them, to the extent that these are now known.

Nutritionists will generally have concentrated in training, experience, or both, in one or more specialty areas of the field, but all can be expected to have at least some familiarity with each of the areas. Thus, within a nutrition unit, nutritionists will have, and will continually be upgrading, information on the distribution of the essential nutrients in foods and drinking water, their probable bioavailability in foods of varying composition, the occurrence and significance of non-nutritional factors in foods, and the effects of common food processing and preparation techniques on the content of nutritional and non-nutritional substances in foods. Some will have specialist-level knowledge of the dietary, anthropometric, biochemical and clinical methods used to evaluate nutritional status of individuals and/or nutritional risks in populations, the appropriateness of standards to given populations and age-sex groups, the diagnostic value of the parameters, and environmental factors that relate to these. Others will specialize in consumer behavior, dealing with questions of food habits and preferences and their measurement, social and cultural influences on food selection, motivation and communication. Still others, or all of these some of the time, will participate in applied nutrition research and in teaching.

The role of the nutritionist in the planning process begins with identification: who is malnourished (their geographical and socioeconomic distribution, age-sex category, numbers), what nutrients are lacking, and why. Some assessment needs also to be made of the evolution and of the nature and magnitude of the problem. Modern problem-oriented diagnostic and planning techniques will be used. All stages of the planning process, from the identification of relevant measures through design and analysis, will require the joint efforts of nutritionists, statisticians, economists and other experts.

*Document prepared for the First Session of the ad hoc Committee of the FAO Council on Food and Nutrition Policies.

The nutritionist will in particular contribute to qualitative studies of the "ecology and etiology" of malnutrition necessary to the identification, design and appraisal of measures appropriate to tackling at least the more proximate causes of malnutrition.

The membership of a problem-oriented planning team will vary according to the nature of the nutrition problem at hand, but is likely always to include planners based in economics, marketing, agriculture, food science and technology, health and nutrition. The working structure of the planning group also will be variable and should not be conceived of as a pyramid with an overall planner always at the apex; rather, the group dynamics and problem definition should determine the structure. The nutritionist might well be the group leader during the phase of identification, but during development of programs, the leader logically will be the planner from the sector most involved. When several measures are proposed to solve an identified nutrition problem, group leadership may change according to topic. The ultimate decision, i.e., enunciation of policy and provision for implementation of strategies, will in any case rest with a designated higher political authority.

Some of the functions of the nutritionist/planner may be listed more specifically as:

- to identify and define nutrition problems and to contribute to the analysis of their causes;
- to provide information for assessing the social and economic costs of malnutrition necessary for formulating criteria in making choices and for establishing priorities in planning;
- to define the needed content of educational programs and appraise their scope;
- to assist in the identification of environmental health-risk factors that affect ingestion,

tion, digestion, absorption, utilization, excretion and loss of nutrients;

- to monitor the nutritional status of the population;
- to plan for regular and ad hoc anthropometric, dietary, clinical and biochemical surveys to detect the existence of adverse trends and to provide early warning, and to evaluate benefits of implemented programs relative to cost;
- to appraise the adequacy of food supply and diet patterns;
- to define the mix of acceptable foods needed for adequacy;
- to evaluate the nutritional impact of proposed agricultural measures, food processing and storage plans;
- to identify vehicles for fortification or enrichment and the stability and availability of nutrients to be added;
- to promote nutritionally-based food labeling legislation and food promotion programs;
- to assess the impact of environmental and health measures on nutritional requirements and malnutrition;
- to provide guidance to other professionals in planning family resources management programs;
- to provide guidance to other professionals in planning programs dealing with home sanitation, child care, etc.;
- to propose and design interim intervention measures such as food distribution, school feeding, etc.;
- to plan interim nutrition rehabilitation and maternal/child-health nutrition programs;

As with other specialists, nutritionists function also:

- to foster the acquisition of new knowledge;
- to plan for institutional support of advanced training in all aspects of nutrition, of basic and applied research projects, and of adequate publications and library facilities; and
- to plan for bilateral and international communication and exchange of information.

BOOKS

Protein Resources and Technology: Status and Research Needs - Research Recommendations and Summary. Nevin S. Scrimshaw, Daniel I.C. Wang and Max Milner. Funded by the Research Applied to National Needs (RANN) program of the National Science Foundation, NSF grant AEN 75-13072. Preparation coordinated by the Department of Nutrition and Food Science, Massachusetts Institute of Technology, Cambridge, Massachusetts. December 1975.

A broad-based study of United States protein resources and research needs has been issued in December 1975 by the U.S. National Science Foundation, Office of Exploratory Research and Problem Assessment, Washington, D.C. The study was coordinated and prepared by the Department of Nutrition and Food Science, Massachusetts Institute of Technology, Cambridge, Massachusetts under the leadership of Nevin S. Scrimshaw, Daniel I.C. Wang and Max Milner.

The objective of the study was to evaluate the United States's ability to meet protein food resources for domestic needs and international food commitments in the intermediate term - until 1985 and in the longer term - until 2000. In view of the close interaction of food, fuel, population, environmental deterioration and other crises, the planning for protein food resources should take into account not only conventional agricultural food production but also identification of the role of foods not conventionally produced and the research needs in these areas.

A critical study of the status, particularly in the U.S. context, of a variety of food resources was carried out, including cereal crops, oilseeds, food legumes, roots and tubers, livestock animals, dairy and meat products, aquatic resources, single cell protein foods, leaf protein resources, and nutrients obtained by chemical synthesis. Each of these resources was critically assessed for probable development, economic feasibility and potential utilization

and the several constraints affecting their use such as nutritional quality, toxicology, environmental impacts, energy needs, processing know how, genetic potentials, marketing, legal and regulatory barriers, were examined. The authors of the report were assisted in this review and preparation of this study by over a hundred leading experts drawn from the government, industry, universities, research institutions and well-known foundations in the United States. A few authorities from outside the U.S.A. also participated. The original contributions and detailed review articles specially commissioned for this study and for analysis by several specialist working groups will be published as full reports and the present document provides an interpretive summary primarily aimed at identification of a limited number of high priority research areas and the level of National Science Foundation support for each. The Report has concluded that nearly US \$200 million should be expended for R&D over the next 10 years. Fourteen research areas with one or more high priority specific projects have been identified for such support. Major on-going research in U.S. agricultural institutions was excluded from these recommendations on the assumption that these will continue to receive the high priority as at present. The fourteen research areas, recommended under the title mission-oriented research, are as follows:

1. Nutrition

- a. Evaluate protein requirements of human subjects at various ages and physiological states using improved metabolic balance techniques.
- b. Improve existing biochemical and biological methods for the evaluation of protein quality to reflect more closely human and livestock nutritional requirements and apply these methods to new or novel protein sources as well as processed protein foods of all types. The urgent needs of plant breeders and regulatory agencies for rapid methods of protein quality evaluation should be taken into account in this research.

2. Toxicology

Undertake basic research on the toxicological hazards associated with new protein sources and conventional proteins processed in new ways, followed, when appropriate, by clinical trials and by efforts to remove, through processing or other means, toxic factors identified in the animal or clinical trials.

3. Biological Nitrogen Fixation

Study comprehensively the area of nitrogen fixation in crops through basic biochemical and genetic research on the nitrogen and carbon metabolism of plants and microorganisms with the objective of reducing the need for synthetic nitrogen fertilizer.

4. Grain Crops for Food and Feed

a. Investigate the metabolic process of oxidative photorespiration in cereals, legumes and leguminous oilseeds, which seriously limits fixed carbon accumulation and thus reduces potential crop yields. The objective should be to identify genetic or other means to control this undesirable metabolic process.

b. Expand research on symbiotic and non-symbiotic nitrogen fixation in cereals with emphasis on development of nitrogen-fixing microorganisms compatible with host cereal species.

c. Intensify basic research to provide new sexual and asexual methods for breeding more productive crops with higher protein potentials. Such studies would involve identification of specific genes and gene groups, use of cell culture, somatic hybridization and chemical stimulation of gene compatibility for broad sexual crosses, as well as other innovative techniques.

d. Study more extensively the uptake of nitrogen in crop plants, and related protein metabolism of seeds, particularly in the cereal grains, in order to identify genetic and other means for increasing protein quantity and quality without seriously compromising crop productivity and other important qualities. This will require improved screening methods to assist plant breeders quickly to identify desirable cultivars in their protein improvement breeding programs.

5. Cereal Protein Technology

Develop new technology for separating,

recovering and concentrating the protein fractions of cereal grains (wheat, corn, sorghum, barley, oats, rice, triticale) and of processed cereal by-products, and for reconstituting or combining them with other constituents to produce attractive new protein foods such as meat analogs, meat extenders, and beverages.

6. Oilseed and Legume Proteins

a. Study modification of the functionality of oilseed and legume proteins by physical, chemical and enzymatic methods to facilitate development of protein materials with wide versatility and acceptability in formulated foods.

b. Intensify studies of the basic cellular and sub-cellular structure of oilseeds and legumes with attention to the location and form of primary constituents (proteins, oils, carbohydrates, etc.), in order to permit development of more efficient technologies for protein and oil recovery with retention of optimal functional and nutritional characteristics.

7. Livestock Animals

a. Expand comprehensive research on the feeding value of various fractions of animal and vegetable wastes for different livestock species (beef, swine, poultry), and develop technology such as fermentation with appropriate microorganisms, or silage treatment, to minimize toxicity or unpalatability, and to upgrade the nutritive quality of waste materials.

b. Study the carryover into animal tissues used for human food of possible toxic or pathogenic factors related to feeding recycled wastes of various kinds to livestock.

8. Dairy, Meat, Poultry, and Eggs

Develop sanitary and microbiologically safe technology for reclaiming as food, dairy by-products, defective livestock animals, muscle and organ tissues, poultry and eggs rejected for food use and used only partially for livestock and pet feeding under present food laws and grading standards.

9. Aquatic Proteins

a. Investigate more thoroughly the basic problems affecting the development and economic efficiency of aquaculture. Studies should include further identification of optimum species for monoculture and poly-

culture systems and examination of the problems in breeding and culturing these species, including their metabolic and nutritional requirements and diseases to which they may be susceptible. Polyculture, which can take advantage of symbiotic relationships among several different species, should be further developed to increase efficiency of feed utilization and thus reduce competition with nonruminant farm animals for feed.

b. Undertake a comprehensive feasibility study on the harvesting and utilization of Antarctic krill for human consumption, taking into account the need to assess integrated harvesting technology, acceptable food products, use of by-products such as chitin, and potential profitability. Since most krill resources occur primarily in international waters, apparently beyond most countries' present or future jurisdictional limits, and because the USSR now leads in the development and application of the relevant technology, NSF should develop a collaborative effort with the Soviet Union if an appropriate agreement can be negotiated.

10. Single cell Protein (SCP) -- Non-Photosynthetic

- a. Clarify the nature, occurrence, and mode of action of substances giving adverse reactions in human feeding, either occurring naturally in, or produced during the processing of, bacteria, yeast or fungi. In addition, more economical methods are needed to reduce nucleic acid content of SCP.
- b. Develop efficient methods for the selective isolation of proteins free from nucleic acids and other undesirable constituents and for producing them with desirable functional and organoleptic properties.
- c. Expand application of SCP technology to waste processing, and recovery for animal feeding, utilizing materials such as cellulosic and other crop and animal wastes, sewage and industrial food wastes.
- d. Improve cell yields and increase the efficiency of heat and oxygen transfer in fermentors, taking into account cooling difficulties in tropical environments and the limitations in cell yields due to inadequate

oxygen supply. Improve efficiency of cell harvesting or collection, dewatering and drying, taking into consideration effects on protein functionality and nutritional properties.

11. Single cell Protein--Photosynthetic
Gather more information on the toxicology, food/feed safety, nutritional value and acceptability as food of algal sources. Develop economically feasible techniques to process algae as human food including means for decolorizing or bleaching, recovery of algal pigments, isolation or concentration of protein constituents and application to food uses; also develop means for preservation by common technologies.

12. Leaf Proteins

- a. Undertake comprehensive research, technological development and testing of an integrated on-farm system for recovery and direct feeding to non-ruminants of leaf protein products, including evaluation of the nutritional and toxicological implications.
- b. Intensify development of technology for recovery of leaf protein concentrates and isolates for food use including evaluation of their nutritional and food safety aspects as well as functionality and organoleptic qualities when used as an ingredient in formulated or fabricated foods. This should include comprehensive study of the unique properties of Nicotiana (tobacco) leaves which permit easy separation and recovery of relatively pure protein, and exploration of agronomic and other factors which relate to its optimal production for such use.

13. Innovative Technology for Protein Utilization

Undertake research to contribute to basic understanding of physical and chemical properties of protein molecules. Study the separation and restructuring of plant proteins and application of chemical engineering technology to the development of edible protein.

14. Targets of Opportunity

Make available funds for innovative exploratory research yet to be identified.

Second Conference on Vitamin C. Edited by C.G. King and J.J. Burns. New York Academy of Sciences, P.O. Box 5075, FDR Station, New York, N.Y. 10022, U.S.A. US \$41.00 (plus \$1.00 for mailing and handling in the U.S. and \$1.50 elsewhere). 522 pp.

This volume contains the proceedings of a conference held in October 1974. Its 51 papers, along with transcripts of discussion periods, present the current views of leading research scientists in the field of vitamin C. Particular emphasis is placed on the

vitamin's relationship to health, biological synthesis, metabolism in plants and animals and its use in foods to protect color, flavor and nutritive value. In addition to dealing with severe vitamin C deficiencies characteristic of scurvy in man and experimental animals, the proceedings also deal with the effects of lesser deficiencies on enzyme, hormone and nutritional balances. In addition, there are discussions of recommended dietary allowances of vitamin C and of its relationship to respiratory diseases, including the common cold. It should be noted that one of the editors, Dr. C.G. King, is a former PAG member (1960 - 1963).

NEWS

PAG Chairman awarded Mexican Science Prize

Dr. Joaquín Cravioto, Chairman of the PAG, was awarded Mexico's National Science Prize (Premio Nacional de Ciencias) for 1975. A pediatrician and leading authority on childhood malnutrition, Dr. Cravioto is professor of pediatrics and head of nutrition at the Hospital Infantil del Niño, IMAN (The Institute for Child Welfare and Health) in Mexico City. He is best known for studies showing

that inadequate early nutrition may retard mental development. The prize, which is awarded by the Government of Mexico through its Ministry of Public Education and National Commission on Science and Technology, was presented to Dr. Cravioto on 29 November 1975 in Mexico City. It is Mexico's highest distinction for scientists and represents a pinnacle in a career devoted to the improvement of the well-being of children--particularly in developing countries.

MEETING REPORTS

FAO/SIDA Seminar on Promoting Foods for Low-Income Consumers in the Andean Region

This seminar was organized by the Food Policy and Nutrition Division of FAO and was sponsored by the Swedish International Development Authority (SIDA). It was held in Lima, Peru from 22 to 27 September 1975 under the auspices of the newly-created Ministry of Food of the Government of Peru. It was arranged on behalf of the six member countries of the Andean Pact -- Bolivia, Chile, Colombia, Ecuador, Peru and Venezuela -- and in collaboration with the Latin American Nutrition Society (SLAN) and the

Latin American Council of Business Administration Schools (CLADEA). There were 75 participants, including 30 official participants from Andean Pact countries. Also taking part were 30 invited representatives of regional and national institutions, food marketing enterprises, international and bilateral agencies (including WFP, ILO, UNDP, UNICEF, IDB and USAID). In addition, there were guest lecturers, a secretariat, and staff participants from FAO. Director of the seminar was N.W. Wilkie of the Food Policy and Nutrition Division of FAO. Co-director was Ing. M.A. de Ingunza of the Ministry of Food, Peru.

The seminar had two purposes: 1) to identify opportunities for improving food marketing, promotion and education services in the interest of low-income consumers; and 2) to provide supplementary training for senior personnel from government, institutions and enterprises responsible for formulating plans and implementing programs which will promote the use of nutritionally beneficial foods in the region. It was one of a series of international seminars and workshops conducted under the FAO/SIDA Cooperative Program for such purposes. The seminar in Lima was convened in response to recommendation of various technical conferences on aspects of nutrition and food marketing in Latin America and to meet the particular needs expressed by countries of the Andean Pact group.

The program was conducted in the form of a technical course, assisted by guest lectures drawn mainly from the participating Andean countries. The introductory address was given by Peru's Minister of Food, General de Brigada E. P. Rafael Hoyos Rubio. Following an initial diagnosis of the nutrition situation in Andean countries and review of approaches which could be adopted for food and nutrition policymaking in the region, the seminar heard reports from each country on problems, programs and priorities for resolving inadequacies of food supplies and inequalities of food distribution and consumption. In subsequent plenary sessions, participants examined systems of management in food marketing, methodologies for the conduct of consumer research, techniques for promotion of specific nutritionally beneficial food items, and facilities for increasing the impact of nutrition education activities aimed at both urban and rural low-income families. Representatives from each country gave case histories of experiences in the launching of innovative food and nutrition programs. In afternoon sessions participants met in working groups, initially to analyze aspects of their countries' food marketing and education programs from the technical standpoint, and subsequently to establish priorities for corrective action at the country and regional levels.

The seminar concluded that systems of food marketing, including product pricing, distribution and promotion, should be considered as a high priority sector for attention within

national plans and programs for nutritional improvement. Specific recommendations for policy and program development within the Andean sub-region were made by each of 15 working groups convened on the following subjects:

1. Institutional structures for food marketing;
2. Marketing training programs;
3. Marketing systems for urban areas;
4. Marketing in rural community development;
5. Fortification and marketing of basic foods;
6. Marketing new foods for low-income consumers;
7. Pricing policies and incentives;
8. Methodologies for market research;
9. Nutrition delivery systems;
10. Research on food behavior;
11. Food advisory services for consumers;
12. Formal and informal nutrition education;
13. Promotion campaign planning systems;
14. The use of mass communications media;
15. Training programs for food and nutrition educators.

Recommendations for action at the sub-regional level to strengthen present activities in these fields were addressed primarily to institutions of the Andean Pact, international agencies and the professional associations directly concerned with nutrition and training in marketing administration within the region. Financial and organizational support was sought for, inter alia, implementing improvements in basic food marketing systems, expanding food storage and transportation facilities, establishing mechanisms for regular sub-regional cooperation in the application of nutrition planning techniques, the conduct of food habits research, the production of supplementary nutrients and food mixtures needed by low-income groups, the execution of food promotion campaigns, the use of mass communications techniques in food education, and the operation of personnel training programs.

A report of the proceedings, conclusions and recommendations of the seminar, which was conducted in Spanish only, will be published shortly by FAO in both Spanish and English. Meanwhile, copies of certain technical papers and further information concerning the seminar can be obtained by quoting the reference "TF-RLA 37 (SWE)" upon application to the Food Policy and Nutrition Division, FAO Headquarters, Via delle Terme di Caracalla, 00100 Rome, Italy.

Meeting Reports continued on back cover.

PROTEIN-CALORIE ADVISORY GROUP

The Protein-Calorie Advisory Group of the United Nations System (FAG) is an interdisciplinary committee of internationally-recognized experts who advise the United Nations and its agencies on technical, economic, educational, social and other related aspects of global malnutrition problems and the broad programs and new areas of activity needed for combating them. Since its inception in 1955, the PAG has emphasized protein-calorie malnutrition as a primary and continuing threat to the health and survival of infants and young children in the developing countries and has played an active role in promoting the development of novel and locally-available protein resources for the developing world. The PAG also reacts to socioeconomic considerations, trends in world food supply and consumption and the need for governmental initiatives and priorities in dealing with these problems.

The PAG is sponsored by the Food and Agriculture Organization of the United Nations (FAO), The World Health Organization (WHO), the United Nations Children's Fund (UNICEF), the International Bank for Reconstruction and Development (IBRD), and the United Nations.

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The purpose of the PAG Bulletin is to promote the exchange of information on the world malnutrition problem among all those who are motivated to work towards its solution. Published quarterly in English, French, and Spanish editions, it is sent gratis to individuals, institutions, and commercial organizations with an active interest in scientific, technological, economic or social aspects of protein-calorie malnutrition on a worldwide basis.

The PAG Bulletin can succeed in its mission only insofar as it can comprehensively and objectively communicate with its readership. Readers are invited to comment in writing on what they read in the Bulletin. In addition, the PAG Secretariat welcomes suggestions for broadening and deepening the scope of the Bulletin, thereby increasing its usefulness.

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MEETING REPORTS

Mycotoxins in Human and Animal Health - An International Conference, 4-8 October 1976.

The conference was held at the Center for Adult Education of the University of Maryland at College Park, sponsored by the U.S. Department of Agriculture, Food and Drug Administration, and National Cancer Institute in cooperation with the U.S. - Japan Cooperation on Natural Resources, Panel on Toxic Microorganisms (UJNR).

The major goals of the conference are: assessment of the human and animal health risks, both long and short term, posed by the contamination of food by toxic fungal metabolites (mycotoxins); clarification of ambiguities which exist for the chemical identification of selected mycotoxins known to contaminate food and feed; provision of definitive quantitative data on the incidence and levels of mycotoxins in foods and feeds; estimation of the prospects for preventing or otherwise controlling mycotoxin contamination of food and the social and economic con-

sequences of any such programs; establishment of uniform standards to guide research, particularly in the areas of methodology and biomedical assessment; provision of concrete recommendations to scientists for future research on mycotoxins; provision of guidance to public health officials responsible for setting food safety standards and clarification of those standards which now exist in several nations.

The sessions will include: aflatoxins; trichothecene toxins; zearalenone; other mycotoxins known to be food contaminants and currently under study; concepts of biomedical assessment of mycotoxin risks; regulatory concepts and effects on food supply. Each invited speaker and panelist has played a key role in the area of investigation he will cover.

Registration fee: \$25.00. For more detail contact: Dr. J.V. Rodricks, Food and Drug Administration, HFF-151, 200 C Street, SW, Washington, D.C. 20204.

Meeting Reports continued on page 31.

ERRATA

PAG Bulletin, Vol. V, No. 2:

1. Page 20, second column: The publication, Food Composition Tables for Use in the English-Speaking Caribbean was mistakenly listed as available free of charge from the Caribbean Food and Nutrition Institute (CFNI). The Director of the CFNI informs us that it is on sale for US \$5.00 (including postage). However, purchasers within the English-speaking Caribbean, in the countries that contribute financially to the CFNI, may obtain the publication at subsidized local prices, EC \$5.00 and J \$2.00.

2. Page 24, first column, at the end of first paragraph under section IV, add the following sentence:

"Thus it must be understood that plant breeding programs should be based on the determined need for food in a country, best evaluated by an assessment of food supply, dietary habits and nutritional status, rather than ad hoc impressions."

3. Page 29, first column, line 24, after the word "assay", add the following reference number: (34).

4. Page 39, first column, second line, add the following reference number to the end of the heading for section 1. Principle: (34).

5. Page 46, reference number 34, change the page numbers to read: pp. 27-39.

PAG Bulletin, Vol. V, No. 3:

1. Page 22, lines 23 and 24, change sentence to read: "The level of nucleic acid fed should be 0.03g/kg/day for eight days at a time."

2. Page 41, column one, in the list of Participants, among the Members add: "Dr. C. Gopalan, Director-General, Indian Council of Medical Research, New Delhi, India."

